

Background

- The *Fuel for Fun (FFF)* project is a theory-based multiple-component cluster-randomized controlled study conducted among 4th graders and their families to promote positive food and activity environments, policies and behaviors at the individual, family and school levels. The impact of *FFF* on students' interest in cooking, fruit and vegetable preferences and activity levels have been evaluated, however, its impact on parent weight outcomes is yet to be investigated.¹⁻³
- Reduced metabolic rate because of aging and low physical activity is correlated to increased BMI.⁴⁻⁸
- BMI is strongly associated with age, sex, physical activity and other physiological phases in life cycle.⁴

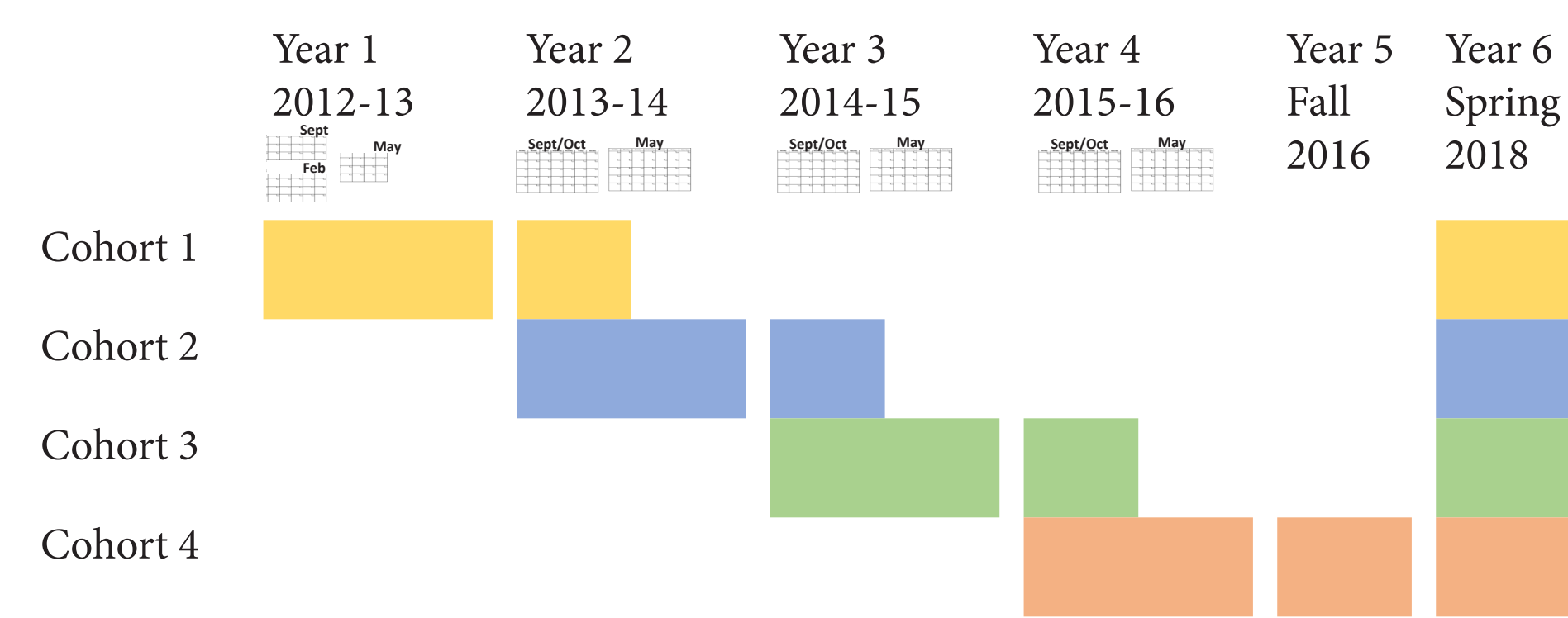
Objective

To assess parent weight change 2-5 y post participation in a controlled trial of a school and family intervention focused on culinary and physical activity experiences for 4th grade youth.

Methods

Study design: a longitudinal trial

Intervention: Youth in *FFF* cohorts 1 and 4 were controls (C) and cohorts 2 and 3 included the multi-component intervention (I). Parents were enrolled in 1 of 4 treatments varying in type and intensity. Parents who had participated with their 4th grader in *Fuel for Fun (FFF)* were recruited via email to enroll in a follow-up (*FFF-FU*) assessment.



Trial registration: Clinicaltrials.gov registration number NCT02491294. Registered 7th July, 2015 and study was approved by the Institutional Review Boards of RIT and CSU.

Data collection: *FFF-FU* survey set included measures from the original study and new items pertinent to parents of adolescents. *FFF* baseline and *FFF-FU* data were collected online using the Qualtrics platform. Parents completed surveys at baseline (BL), post-intervention, and 4 months post-study. *FFF-FU* data were collected spring 2018, 2 to 5 years post-BL.

The data collection tools included:

- Self-reported height and weight⁹ at BL and *FFF-FU*.
- Self-reported socio-demographic factors including ethnicity, gender, education and age at BL and *FFF-FU*. Perimenopausal was defined as including age 47 or higher¹⁰ at either BL or *FFF-FU*.
- Low income was denoted as using an income-based program or worry about money for food.
- Parent Perceived Stress was assessed using the visual analog scale 0 (no stress) to 10 (extreme stress).¹¹
- The validated International Physical Activity Questionnaire (IPAQ) 8-item questionnaire was used to help parents recall physical activity 7 days prior to the survey. All physical activities conducted at home, work, leisure and sports were reported.¹²

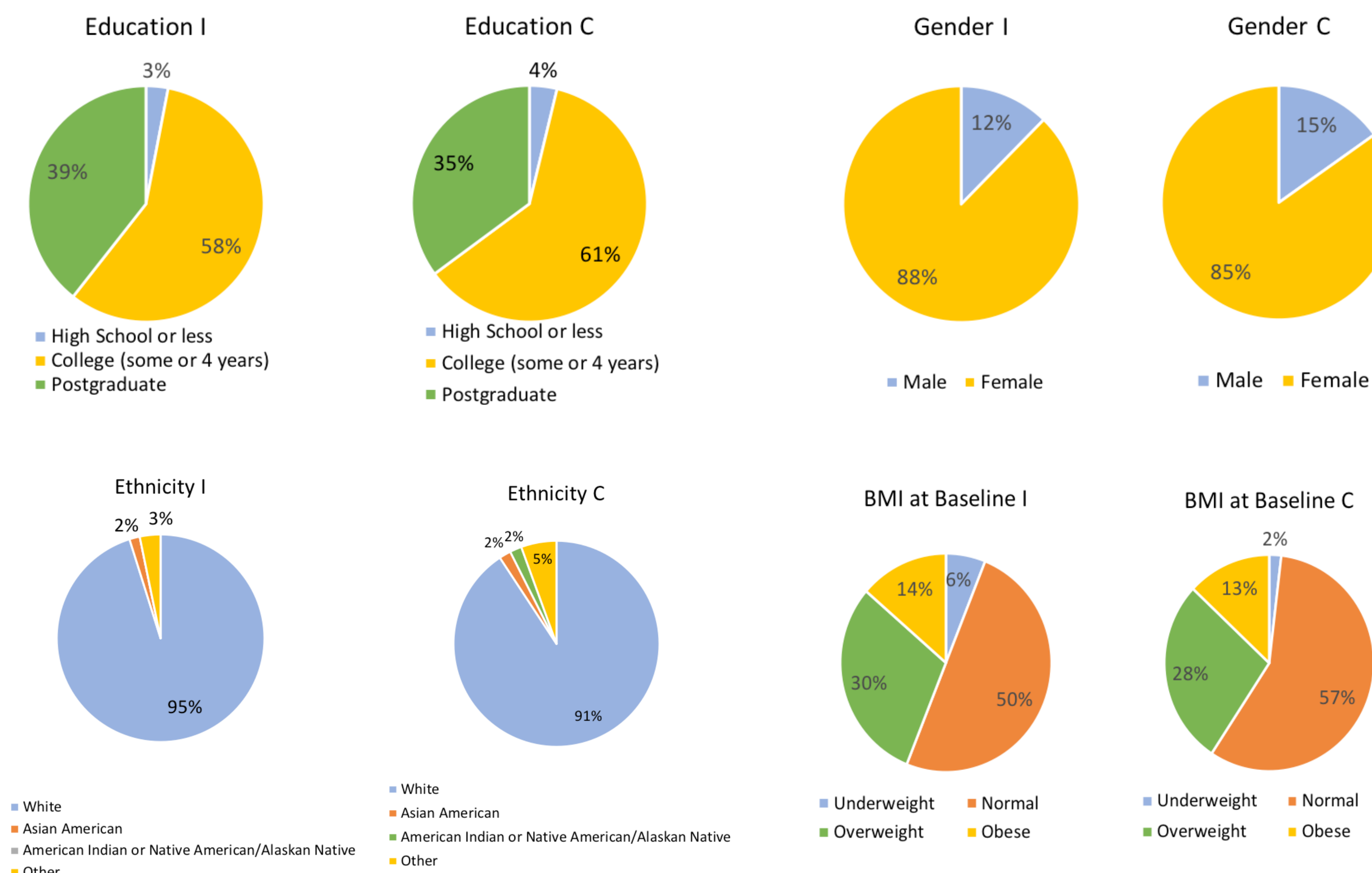
Analysis

- Data were analyzed with SPSS version 25 (2017). BMI was calculated with self-reported height and weight BMI was categorized as underweight, normal, overweight or obese according WHO guidelines.^{4,13}
- Demographic data were examined using descriptive statistics. The IPAQ data were divided into low, moderate or high activity levels.
- Data were analyzed using General Linear Model for repeated measures, controlling for BL or *FFF-FU* sociodemographics, and health behaviors. Chi-square was used to assess the differences in BMI classes.

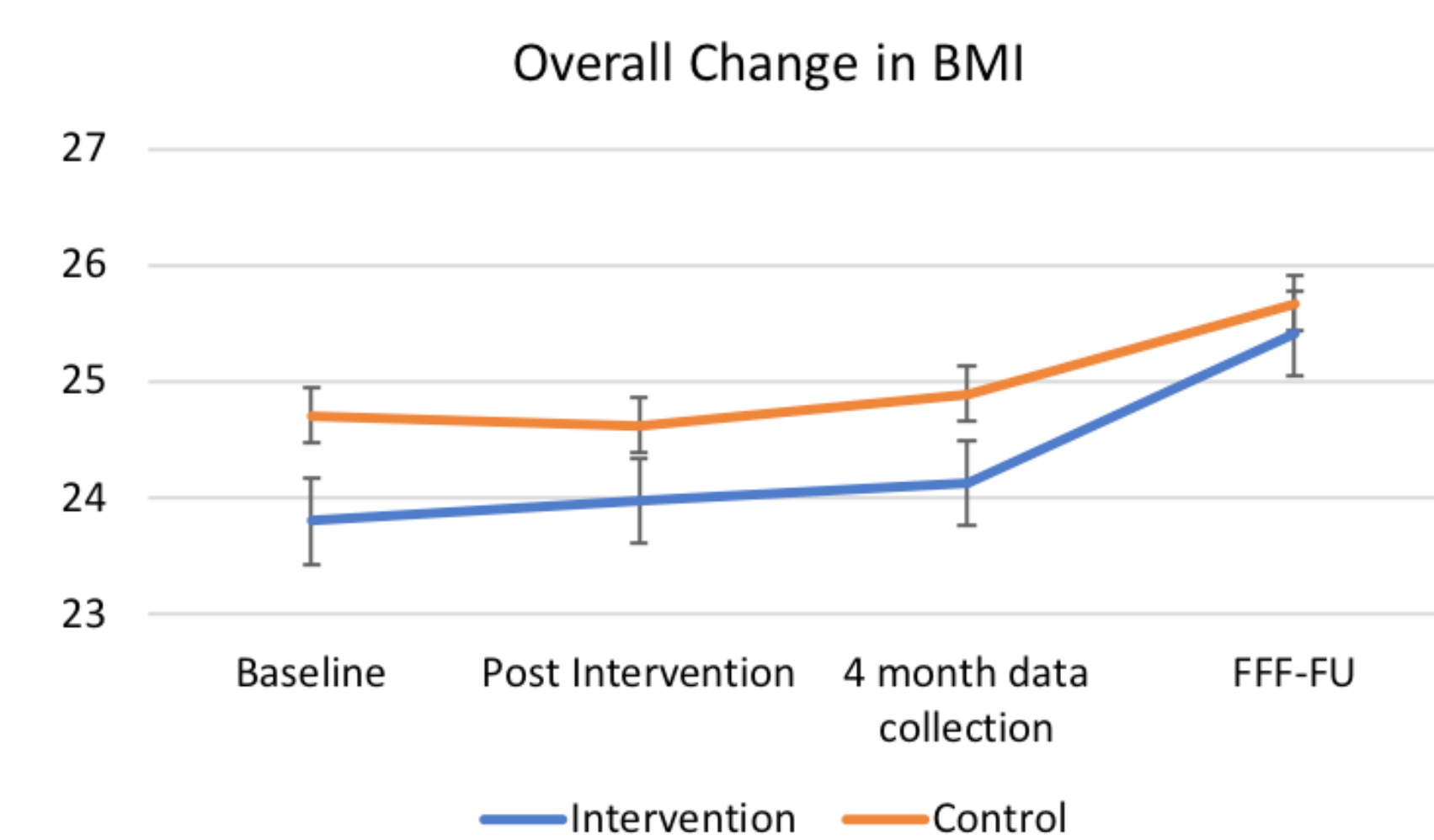
Results

Background characteristics and baseline BMI

- Of the 418 *FFF* parents, 127 completed *FFF-FU* surveys (mean age 42.5 ± 6.0 y) with 115 providing weight and height.
- FFF-FU* sample was female (88%), white (84%), active (44% high activity), educated (69% college degree or higher), but had lower BMI (p = 0.039) and fewer with low income (p = 0.015) than *FFF* parents.



- Mean age at *FFF-FU* was 42.7 ± 5.9 SD years.
- More women were in perimenopausal age at *FFF-FU* (n = 32, 25%) compared to 7 (5.5%) at baseline.
- Intervention (n = 18, 15%) and control (n = 7, 6%) did not differ in the number of women at perimenopausal age.



- Of *FFF-FU* providing heights/weights at the 4 assessments, mean (SE) BMIs were 24.2 (0.5), 24.4 (0.5), 24.6 (0.6) and 25.7 (0.6) respectively.
- Overall, change in BMI was significant after controlling for age, stress, ethnicity, sex, physical activity level, parent treatment and engagement (all p < 0.05), but not when BL to *FFF-FU* change in age (p = 0.079) was controlled.

Funder

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Results

BMI category was stable from Baseline to FFF-FU for 77% of parents.

Table 1. Change in Parent BMI class from Baseline to FFF-FU¹

Baseline BMI Class	FFF-FU BMI Class			
	Underweight (n=4)	Normal (n=59)	Overweight (n=31)	Obese (n=26)
Underweight (n=5)	3	2	0	0
Normal (n=64)	1	53	9	1
Overweight (n=35)	0	4	21	10
Obese (n=16)	0	0	1	15

1. Table entry represents number of participants

Key (Tables 1 & 2)

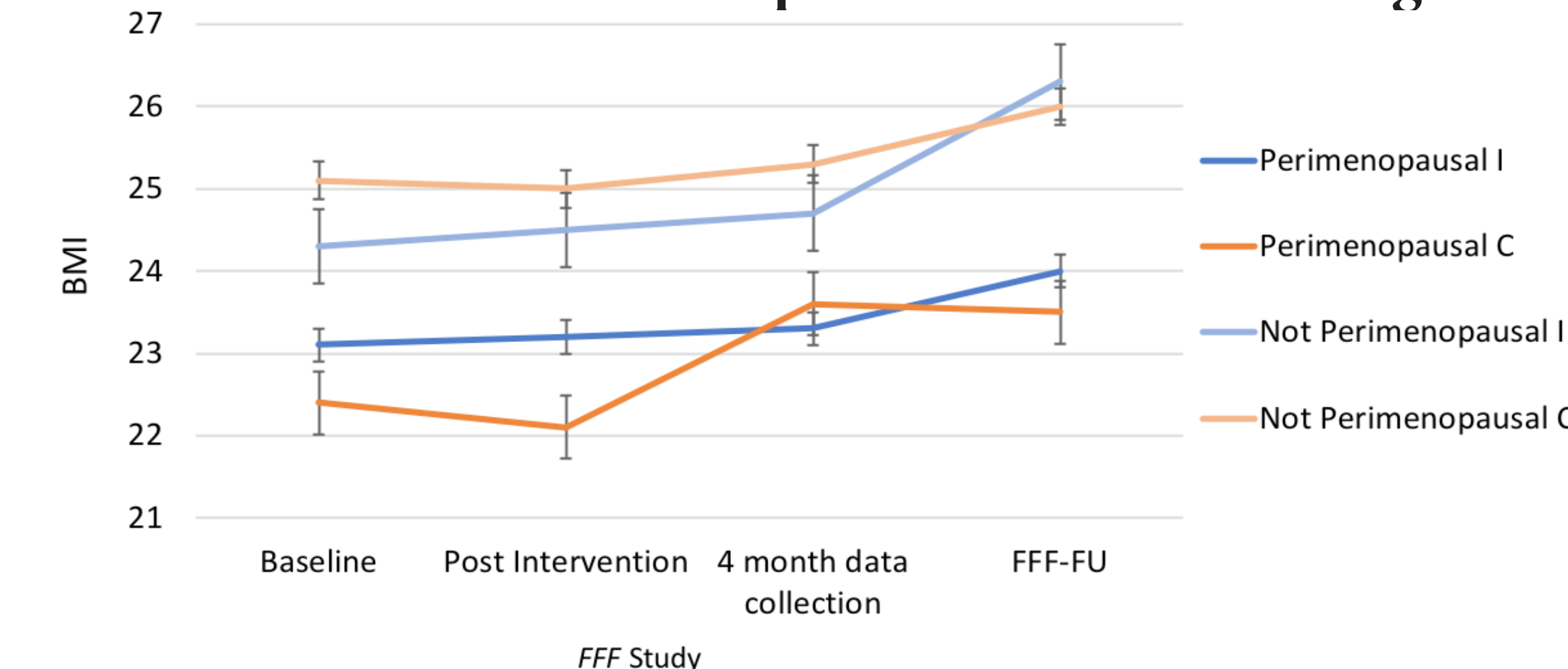
- Moved toward normal BMI
- Stable BMI class
- Moved away from normal BMI

20% of parents with children in the intervention group moved away from normal BMI class compared to 15% of parents with children in the control group.

Table 2. Change in Parent BMI class from Baseline to FFF-FU between Intervention Groups

Baseline	FFF-FU Intervention (n=60)				FFF-FU Control (n=60)			
	Underweight (n=2)	Normal (n=25)	Overweight (n=17)	Obese (n=16)	Underweight (n=2)	Normal (n=34)	Overweight (n=14)	Obese (n=10)
Underweight (n=5)	2	1	0	0	1	1	0	0
Normal (n=64)	0	24	6	0	1	29	3	1
Overweight (n=35)	0	0	10	6	0	4	11	4
Obese (n=11)	0	0	1	10	0	0	0	0

Association Between Perimenopausal Status and Change in BMI for Female Parents



The significantly greater increase in BMI for parents of intervention youth than controls persisted when controlling for socio-demographic and health behavior findings, but not when BL to *FFF-FU* perimenopausal age (p = 0.649) was controlled for female parents.

Conclusion

Significant weight gain by parents of youth in a nutrition intervention 2 to 5 years post-study was unrelated to stress, ethnicity, activity level, income, but was related to the age change from baseline and perimenopausal age.

References

- Cunningham-Sabo L, Lohse B, Smith S, Browning R, Strutz E, Nigg C, Balgopal M, Kelly K, Ruder E. Fuel for Fun: A cluster-randomized controlled study of cooking skills, eating behaviors, and physical activity of 4th graders and their families. *BMC Public Health*. 2016; 16:444. DOI: 10.1186/s12889-016-3118-6. <http://www.biomedcentral.com/1471-2458/16/444>.
- Cunningham-Sabo L, Lohse B. Fuel for Fun: Cooking with Kids Plus Parents and Play. Presented at: Highlight session of USDA/NIEFA Childhood Obesity Prevention program grants Society for Nutrition Education and Behavior Annual Meeting, Washington, DC, July, 2017.
- Lohse B, Smith S, Nigg C, Cunningham-Sabo L. Self-Reported Change in Physical Activity and Screen Time in 4th Graders Shows Gender, Seasonal and Weight Status Differences Even in Absence of an Intervention Effect. Poster presented at Society for Nutrition Education and Behavior Conference, San Diego, 2016.
- Gibson RS. Principles of nutritional assessment. Second edition. New York: Oxford University Press; 2005.
- Davis S.R., Castelo-Branco C, Chedraui P, Lamden M.A., Nappi R.E., Shah D, and Villaseca P. Writing Group of the International Menopause Society for World Menopause Day 2012. Understanding weight gain at menopause. *Climacteric*. 2012; 15(5):419-29. doi: 10.3109/13697137.2012.701111
- Kapoor, E., Collazo-Clavell M.L. and Fabian S.S. Weight Gain in Women at Midlife: A Concise Review of the Pathophysiology and Strategies for Management. *Mayo Clin Proc*. 2017; 92(10):1552-1558.
- Dubnov, G., Brzezinski, A., and Berry, E.M. Weight control and the management of obesity after menopause: the role of physical activity. *Maturitas*. 2003; 44: 89-101.
- Al-Safi, Z.A. and Polotsky, A.J. Obesity and Menopause. *Best Practice & Research Clinical Obstetrics and Gynecology* 2015; 29:548-553.
- Quirk V, Byrd-Bredbenner C, Shoff S, White A.A, Lohse B, Horacek T, Kattmann K, Phillips B, Hoerr S.L, Greene G. Concordance of self-report and measured height and weight of college students. *Nutr Educ Behav*. 2015 Jan-Feb; 47(1):94-8. doi: 10.1016/j.neb.2014.08.012. Epub 2014 Oct 12.
- Ellen G.B. 2011. The Timing of the Age at Which Natural Menopause Occurs. *Obstet Gynecol Clin North Am*. 38(3): 425-440.
- Parks EP, Kumanyika S, Moore RH, et al. Influence of stress in parents on child obesity and related behaviors. *Pediatrics*. 2012; 130:1096-1104.
- Craig CL, Marshall AL, Sjoström M, et al. 2003. International physical activity questionnaire: 12-country reliability and validity. *Med Sci Sports Exerc*. 35:1381-95.
- World Health Organization. Obesity: Preventing and managing the global epidemic. World Health Organization - Technical Report Series 894. Geneva: 2000.